

*What Can You Expect ?*

No one likes to talk about it - or think about it for that matter - but the specter of another 9/11 type terrorist attack is ever present in today's new look world of weekly bombings and beheadings. Many believe it is merely a matter of time before such an attack causes a severe market crash, and the disturbing but necessary question of how such a crash would affect your trading system investment must be acknowledged.

Many trading system investors think of the risk involved in their trading system in terms of stops and drawdowns only, thinking their worst case scenario for any one day is equal to the stop loss amount - between \$1,250 and \$2,500 for most day trading systems. This is a fair gauge of what to expect in normal market circumstances, but what about abnormal circumstances which see drastic spikes lower. In thinking in terms of worse case scenarios, it is important to remember just what a futures contract entails.

In the case of S&P 500 futures, investors who purchase or sell such contracts are in effect controlling an amount of money equal to the index value times the contract value of \$250. At the S&P index's current value of approximately 1135, those buying or selling S&P futures are therefore controlling over a quarter of a million dollars ( $1135 * \$250 = \$283,750$ ).



Most investors think nothing of holding a single S&P futures contract, but would be downright frightened to be holding \$283,000 in stock during a market crash. It is important to recognize that they are one in the same thing as far as the risk to your portfolio is concerned.

So what type of move might one expect from another devastating terrorist attack. We need only look back to September 11th, 2001 for clues.. The S&P futures were not yet open that fateful morning as the planes hit the towers around 7:30 AM Chicago time, but the effect on the market was profound. Within seconds, S&P futures traded in the overnight Globex market had sold off over 40 points to lock limit down, then remained closed for 6 days before reopening another 40 points lower.

In the end, many investors were locked out of the market until it reopened at the lows on September 17th, a full 76.5 points lower, or 6.93%. Investors trapped on the wrong side of that move could have experienced losses of close to \$20,000 per single S&P contract - quite a bit more than the \$1,000 to \$2,000 stop loss many rely on.

The one fortunate thing for trading system investors that day was that the attack did happen before the market was open. But it is important to realize such a move could happen in the future, and could happen during normal trading hours. The 9/11 sell off represented a 7% move, or approximately 3.5 times

the average volatility (one standard deviation of recent prices). The equation for computing standard deviation is labeled with the Greek symbol 'Sigma', and multiples of that volatility are referred to as a multi-sigma events.

If daily returns were normally distributed, one would expect approximately 99.7% of returns to be within plus or minus 3 sigma at a frequency of about one day per every 1 \_ years. Once every 1 \_ years isn't too rare, thus we can conclude that lower end multi-sigma events are "normal" for a normal distribution within limits. As the magnitude of the sigma increases, the probability of that event happening drops dramatically. A 3.5 sigma move, for example, would have a probability of occurring just once every 10 years.

The standard deviation of daily price changes for the S&P index on 9/10/01 was about 1.2% per day. (On an annualized basis, this represents a volatility of about 19%). The 7% move following 9/11 represented a move of about 5.8 sigma, and had a (normal) probability of occurrence of just once every 4000 years. The actual probability is higher because the distribution is not really normal.

That such a move, a multi-sigma event, could happen in a single day is highly improbable statistically speaking. For normally distributed data, multi-sigma events greater than 3 should occur with the same frequency as unicorn sightings. (Looking at actual S&P index data for the last 12 years, daily moves greater than 3 sigma occurred with a frequency of ~2.5 days per year. The theoretical frequency for a normal distribution would be ~0.5 times per year, showing that the actual distribution is flatter than "normal").

Given normally distributed data, the two sigma level should encompass 95.44997% of all occurrences, while a three sigma measurement should encompass 99.73002% of all occurrences. The four and five sigma confidence limits are 99.99366% and 99.99994% respectively. The odds of a 10 sigma event, therefore, are so remote as to be thought nearly impossible. (IF the distribution is normal)

In the real world, however, and especially in the financial markets, statistically rare events occur with frightening regularity. Consider the market crash of October 1987 which saw a one day decline of 21%. That move was a 20-sigma event. Two years later in 1989 there was an 8% sell off representing a 7-sigma event. Multi-Sigma events aren't the exclusive domain of stock indices either. February 24th, 2003 saw Natural Gas prices rise 42% in a single day, representing a 12 sigma event.

These one day declines simply shouldn't have happened given the entire 100 year plus daily history of the stock market, yet there they were a mere two years apart. The real world equivalent would be boarding an airplane only to see every person on the plane as tall as 7 foot 6 inch Chinese basketball player Yao Ming.

Daily crashes representing five to ten sigma events can and will happen. They are rare indeed, but not as rare as we would expect from statistics (predicated on the normal distribution). This means trading system investors can't be lulled to sleep by the current low volatility environment which pegs daily risk as a system's stop loss. Too many investors calculate their exposure based off these stop levels alone, or worse, on day trading margin requirements.

So whether you are trading a single contract on a system such as R-Mesa, or multiple contracts across several different day trading systems, please be cognizant of the affect a 9/11 type attack could have on the market. A 7% drop in the S&P futures, or 75 points at current prices, without the ability to exit a long trade is a real possibility. That would be a loss of approximately \$20,000 per contract, or nearly 10 times the expected loss. While this would not be the end of the world for those properly capitalized, the affect is magnified the more contracts and more systems you employ.

The table below shows the dollar losses (or gains if short) which would apply given a multi-sigma shock at the listed levels: 3, 4, 5, 7, 10, and 20 sigma events, multiplied times the given number of contracts. While we have listed multi-sigma events out to the 20-sigma level represented in the October 1997 crash, that sell off was not without opportunities to exit your position. It is the (5.8) sigma event of 9/11 which worries us, where investors could not get out until the market had fallen 7%. While the probability of anything more than a five sigma event happening without the opportunity to exit your position is indeed remote, it is still greater than zero.

The obvious question following the identification of this risk is: "What can we do about it?" The easiest way to hedge against it is to not trade, but that removes any chance of profits as well. Indeed, the very reason many day trading systems may be profitable on a short time frame is that they accept relatively small profits (2 to 5 points) in exchange for being exposed to potentially huge losses (75 points).

A better hedge and equally as simple would be to buy an out of the money put every time you are long across a set number of systems. An out of the money put would not change much in price even if the trade made money for the day, and you would lose little to no time value by getting into and out of the put within the same day. Of course, like all insurance, there are costs involved, and each investor must weigh those costs against the possible benefit in a worst case scenario.

<b>Contracts</b>	<b>3-Sigma</b>	<b>4-Sigma</b>	<b>5-Sigma</b>	<b>7-Sigma</b>	<b>10-Sigma</b>	<b>20-Sigma</b>
1	(\$9,375)	(\$12,500)	(\$15,625)	(\$21,875)	(\$31,250)	(\$62,500)
2	(\$18,750)	(\$25,000)	(\$31,250)	(\$43,750)	(\$62,500)	(\$125,000)
5	(\$46,875)	(\$62,500)	(\$78,125)	(\$109,375)	(\$156,250)	(\$312,500)
10	(\$93,750)	(\$125,000)	(\$156,250)	(\$218,750)	(\$312,500)	(\$625,000)